



INFLUENCE OF INVENTORY MANAGEMENT ON THE PERFORMANCE OF THE ENERGY SECTOR IN KENYA: A CASE OF KENYA POWER LIMITED

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Abstract: Inventory constitutes the most significant part of firms in the energy sector. Because of the huge inventories maintained, a considerable sum of an organization's fund is being committed to them. Thus it becomes absolutely imperative to manage inventories efficiently so as to avoid the costs of changing production rates, overstocking, stock outs and unnecessary cost. This study therefore sought to investigate on the influence of inventory management on the performance of the energy sector in Kenya with a special focus on Kenya Power Limited. The study also sought to establish the influence of raw material management, inventory control, warehouse management and process auditing on the performance of Kenya Power Limited. This study used descriptive research design. The target population of this study was all the 146 staff working in the three levels of management in Kenya Power Limited. This was a census study and hence all the 146 respondents were included in the study. The study used primary data which was collected by use of self-administered questionnaires; the questionnaire includes structured and unstructured questions. Data analysis was both quantitative as well as qualitative. Qualitative data from the open ended questions was analyzed by use of thematic analysis and the results were presented in a prose form. On the other hand, quantitative data was edited and coded into Statistical Package for Social Sciences (SPSS version 22) for analysis. Both descriptive and inferential statistics were used to analyze quantitative data. The analyzed data was then presented in tables and figures. A multivariate regression analysis was also carried out to determine the relationship between dependent variable and the four independent variables. The study found that inventory control influences the performance of Kenya Power Limited most, followed by material management, Warehouse management and Process auditing. The study recommends that Kenya Power Limited to should enhance material flow in the organization as a way or enhancing efficiency in service delivery. The study also recommends that Kenya Power Limited management should improve inventory tracking by adopting information technology.

Key Words: Inventory control, Material management, Process auditing

Introduction

Since the mid1980s, the strategic benefits of inventory management and production planning and scheduling have become obvious. Nee (2014) highlights the success of Japanese, European and North American firms in achieving unparalleled effectiveness and efficiency in manufacturing and distribution. In recent years, many of the firms have raised the bar, yet again by coordinating with other firms in their supply chains. For instance, instead of responding to unknown and variable

demand, they share information so that the variability of the demand they observe is significantly lower.

Khmelnitsky and Singe (2015) continue arguing that in the United States of America and other Western Countries, productivity improvement was pursued by reducing the amount of direct labor expended per unit of output. This was a valid strategy because of high labor content in many manufactured products. In spite of this, the proportion of unit costs resulting from labor has been steadily decreased in recent years. In fact the ratio of purchased materials to sales (in dollars) reached 60 percent for US firms in 1985 (Seungjae, Ennis & Spurlin, 2015). This implies that management of raw materials inventories is an area that shows great promise for productivity and supply chain improvement. Japanese firms received much-deserved attention in the mid-to-late 1980s because of their remarkable performance on quality and inventory management. The tremendous interest in Just-in-Time manufacturing indicates that work-in-progress inventory management is also an area ripe for improvement (Buyukkaramikli, Ooijen & Bertrand, 2015).

In recent years, a number of firms have faced numerous challenges especially in inventory management or material control, thus affecting the performance of companies. There have been cases of materials overstocking which eventually get expired or out dated, under stocking, lack of stock-taking, theft of materials by workers and delays in deliveries of materials into the organizations among others. Over the years, companies all over the world had adopted the concept of inventory management as a way of improving their supply chain performance. In America, inventory contributes to almost sixty percent 60% of the annual turnover in the manufacturing firms (Seungjae, Ennis & Spurlin, 2015). This shows clearly that a lot of concern should be given to inventory management to avoid unnecessary costs. Actually any function of the firm which accounts for well over half of its receipts certainly deserves a great deal of managerial attention. In Indonesia, Rachmania and Basri (2013) found that the three major issues regarding inventory management practice include overstock, unjustified forecasting technique and lack of IT support. By implementing a new inventory policy that cope all the constraints and problems will help hospital to manage its pharmacy inventory in effective and efficient way. Several objectives in inventory control such as minimize inventory investment; determine the appropriate of customer service level; balance supply and demand; minimize ordering cost and holding cost; also preservation of inventory control system. In India, Kumar and Bah (2014) found that inventory constitutes the most significant part of current assets of larger majority of Indian manufacturing industries and because of the relative largeness of inventories maintained by most firms, a considerable sum of an organization's fund is being committed to them.

In Nigeria, Augustine and Agu (2013) found that irrespective of the fact that most organizations in Nigeria attempt to apply the tenets of good inventory management, they from time to time run into the problems of inventory inadequacy. This consequently affects their production, leading to the scarcity of one brand of their products or the other, thereby affecting their profitability and consequential effectiveness negatively. Inventory management has a significant effect on organizational effectiveness, productivity and profitability. In addition, the entire profitability of an organization is tied to the volume of products sold which has a direct relationship with the quality of the product.

Inventory plays a big part in service firms in Kenya as it account for about 56% of the annual turnover. Kenyan organizations are faced with a lot competition in the current markets. This has led to the need for coming up with better method of managing and measuring how resources are utilized by various jobs or products, and therefore be able to eliminate any wastage in the value chain. The new inventory

management methods require having the right persons doing the right job. In this case, the major concern is how inventory functions are organized and actually who is responsible over these functions in the Kenyan service firms (Rachmania & Basri, 2013). The increasing emphasis on the competitiveness has led to a new emphasis on the competitive advantage through effective utilization of organization resources. It is essential to address fundamental competitive advantage through cost reduction. Issues like competitive buying, buying wisely, effective and reliable sources of supply, to keep inventory investment and inventory costs at a practical minimum, are the current business.

Energy in Kenya describes energy and electricity production, consumption, import and export in Kenya. Kenya's energy mix is predominantly defined by three energy sources: biomass, petroleum, and hydropower for electricity. Traditional biomass use represents about 70% of the energy consumption in Kenya, while petroleum and electricity account for 21% and 9% respectively. In the electricity sector, the generation mix is dominated by hydropower which makes up 49% of the total installed capacity in 2013. Fossil-fuel generation plants make up 33.5% of the total capacity while geothermal, wind and cogeneration make up the other portion of renewables in the mix.

Due to high average generation costs of the current energy sources (25% of the total electricity generation is produced with diesel, 53% by hydro); Kenya has, compared to neighboring countries, high electricity tariffs (USc 19.7/kWh versus USc 3/kwh in Ethiopia and USc 9/kwh in Tanzania). As such, the lack of adequate and affordable energy has often been cited as a major constraint to growth. Power outages have been estimated to cost the Kenyan economy 7% in lost private sector sales revenue, 2% of total GDP and 1.5% of GDP growth.

Players in the energy sector in Kenya include Kenya Electricity Generating Company (KenGen), Kenya Renewable Energy Portal, Energy Regulatory Commission (ERC), Ministry of Energy, Rural Electricity Authority (REA), Kenya Electricity Transmission Company (KETRACO), Geothermal Development Company (GDC) and Kenya Nuclear Electricity Board (KNEB).

Statement of the Problem

Electricity is a primary factor of development and should therefore be harnessed, and developed in an efficient manner. It should also be available in adequate quantity, quality and affordable prices. The level and intensity of commercial energy use in a country is a key indicator of the degree of economic growth and development. Energy is one of the enablers for Kenya Vision 2030. Sustainable, affordable and reliable energy for all citizens is a key factor in realization of the vision 2030.

However, the performance of Kenya Power Limited in terms of inventory management of goods and services in the recent past has been below expectation and this has raised anxiety among the stakeholders. The organization has also registered a number high number of complaints relating to power blackouts and delayed responses to emergency cases as well as power lines and transformers repairs. According to Okinyi (2015), 76% of the delays in power lines and transformers repairs are caused by lack of inventory in KPLC. In addition, the Kenya Power and Lighting Limited (2012) annual report indicated that more than 50% of the total inventories in the organization were delivered after the expected time, which negatively affected service delivery. According to KPLC Customer satisfaction survey of 2010, 2011 and 2012, it is notable that the percentage index has been fluctuating, that is, 69%, 70% and 66% respectively. According to Kenya Power and Lighting Limited (2012) annual report the company's profit before tax decreased by 24.48% from Ksh 8,507 million in 2012

and 6,424 Ksh million in 2013. In addition, the expense cost increased to Shs24.217 billion in the year 2015 from Shs.22.749 billion in the year 2014.

Various studies have been conducted on inventory management in Kenya. For instance, Lwiki et al. (2013) conducted a study on the impact of inventory management practices on financial performance of Sugar Manufacturing Firms while Oballah, Waiganjo and Wachiuri (2015) carried out a study on the effect of inventory management practices on organizational performance in Public Health Institutions in Kenya. However, most of the studies conducted in this area are limited to various sectors. There is therefore little empirical evidence showing the influence of inventory management on the performance of the energy sector in Kenya. This study therefore sought to investigate the influence of inventory management on the performance of the energy sector in Kenya with a special focus on Kenya Power Limited.

The specific objectives of the study were;

1. To establish the influence of raw material management on the performance of the energy sector in Kenya
2. To determine the influence of inventory control on the performance of the energy sector in Kenya
3. To examine the influence of warehouse management on the performance of the energy sector in Kenya
4. To analyze the influence of process auditing on the performance of the energy sector in Kenya

Theoretical Review

According to Greener (2008), a theory is a coherent group of tested propositions commonly regarded as correct and that can be used as principles of explanation and prediction of class phenomena. In line with this definition, the study will use four theories related to the four independent variables of the study. These theories include queuing theory, theory of economic order quantity, theory of constraints and theory of cost control and reduction.

Queuing Theory

According to Sundarapandian (2009), queuing theory is a mathematical study of waiting lines or queues. The theory enables mathematical analysis of several related processes, including arriving at the back of the queue, waiting in queue (a storage process) and being served in front of the queue (Sundarapandian, 2009). The theory permits the derivation and calculation of several performance measures including the average waiting time in the queue or the system, the expected number waiting or receiving service, and the probability of encountering the system in certain states such as empty, full having an available server or having to wait a certain time to be served (Boucher & Couture-Piché, 2015).

Queuing model can be utilized to model the material handling system variations and genetic algorithm can be implemented to solve the integrated optimization problem. It is also demonstrated that the proposed optimization approach can significantly improve a production system with respect to total travelling time, total work-in-progress in the system, utilization and quantity of material handling equipment and required area (Sundarapandian, 2009). In this study, the queuing theory is used to explain the association between warehouse management and organizational performance. The use of the queuing theory helps organization to optimize facilities layout design and material handling

systems while minimizing storage cost (Sundarapandian, 2009). Warehouse management in energy production companies helps to reduce the number of staff required, storage area as well as time taken to store or retrieve various materials for use.

Theory of Economic Order Quantity

EOQ model was developed by was Ford Wilson Harris in 1913 and is also known as Wilson EOQ model, who critically analyzed the model in detailed (Harris, 1990). The use of the model has shown increase in some costs as other costs decline, an example of ordering costs decline with the inventory holdings, while holding costs rise and the total inventory associated costs curve have a minimum point. It is also known as the point where total inventory costs are minimized. EOQ is the level of inventory that minimizes the total of inventory holding costs and ordering costs.

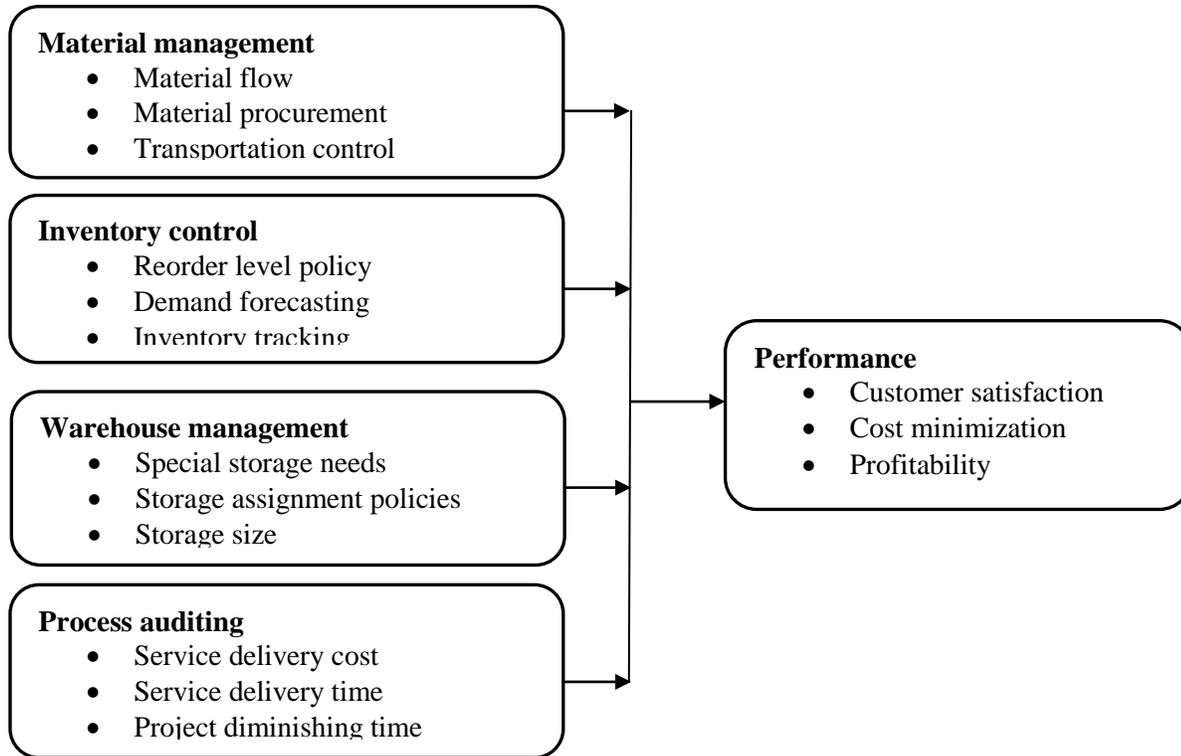
Harris (1990) define the model as one that order quantities which minimize the balance of cost between inventories holding costs and re-order costs. Ogbo (2011) describes the basic EOQ, assumptions that are necessary to calculate EOQ as follows: That stock holding costs are known, and constant; ordering costs is known and constant; the rate of demand are known and constant; lead time cycle is known and constant; the price per unit is constant; the replenishment is made instantaneously, the whole batch is delivered at once and no stock-outs are allowed. One disadvantage of EOQ is that it ignores the need to have buffer stocks, which are maintained to cater for variations in lead-time and demand making it difficult to be observed in practice. The EOQ model requires that for every item stocked in the stores, there is need to determine the point of order and that of the most cost effective quantity to order (Holmbom & Segerstedt, 2014). The model assumes that all other variables are constant even though uncertainties are common and regular all business.

Theory of Cost Control and Reduction

According to the theory of cost control and reduction, cost control reduces costs at the given level in an organization (Uthayakumar & Rameswari, 2012). The accent is an adhering to the pre-determined standard and the emphasis is on ensuring that the cost does not exceed the said standard budget. Acceptance of the given standard as "ideal" builds up a static approach and the attention of the management is confined to the analysis of variances alone in line with the principle of management by exception. Cost reduction is however, a dynamic exercise, an all-out effort to reduce cost from whatever level they are. Nothing is assumed as "standard", nor "anything is accepted as "ideal". Every element of cost is scrutinized, every operation is screened and every procedure is analyzed to identify the ways and means of reducing costs (Uthayakumar & Rameswari, 2012). In this study, the theory of cost control and cost reduction will be used to explain the role of process auditing in improving supply chain performance in organizations. Processes in energy distribution companies include acquiring of material, billing, installation of power lines, and maintenance of power lines and distribution of electricity.

Conceptual Framework

This study sought to investigate on the influence of inventory management on the performance of the energy sector in Kenya with a special focus on Kenya Power Limited. The independent variables in this study were raw material management, inventory control, warehouse management and process auditing. On the other hand, the dependent variable was the performance of Kenya Power Limited.



Independent Variables

Dependent Variable

Figure 1: Conceptual Framework

Empirical Review

Organizational Performance

Organizational performance (OP) is an indicator which measures how well an enterprise achieves their objectives (Hamon, 2003). Organizational performance can be assessed by an organization's efficiency and effectiveness of goal achievement. According to Andersen (2006) effectiveness is conceptualized as a degree of goal attainment. Schermerhorn et al., (2002) points out that performance refers to the quality and quantity of individual or group work achievement. A number of studies have applied different ways to measure organizational performance. Steer (1975) reviewed 17 organizational effectiveness models, integrated these measurements of organizational performance from various studies, and generalized these measurements into three dimensions: financial performance, business performance and organization effectiveness. Delaney and Huselid (1996) suggested two ways to assess Organizational performance: Organizational performance and market performance. According to Delaney and Huselid (1996) Organizational performance is concerned with product or service quality, product or service innovation, employee attraction, employee retention, customer satisfaction, management/employee relation and employee relation while market performance is concerned with organizational marketing ability, total growth in sale, and total profitability.

Raw Material Management

Materials Management is a tool to optimize performance in meeting customer service requirements at the same time adding to profitability by minimizing costs and making the best use of available resources. The basic objective of Materials Management as explained by Khader et al. (2014) is to ensure that the right item is bought and made available to the manufacturing operations at the right time, at the right place and at the lowest possible cost. According to Khmelnsky and Singer (2015), materials management is a concept which brings together the responsibility for determining the manufacturing requirement that is scheduling the manufacturing processes and procuring, storing and dispensing materials (Buyukkaramikli, Ooijen & Bertrand, 2015). An integrated approach to material management defines it as the function responsible for the coordination of planning, sourcing, purchasing, moving, storing and controlling materials in an optimum manner so as to provide a predetermined service to the customer at a minimum cost. These definitions provide the scope of materials management which includes materials requirements planning (MRP), decision on purchasing, procurement of materials, staffing, production and distribution of finished goods at minimum cost at due time.

Inventory Control

Inventory control is a reliable means in which businesses are been managed to ensure customers are satisfied and organization remains in operations via minimization of losses. Inventories are basically stocks of resources held for the purpose of future production and/or sales. Inventories may be viewed as an idle resource which has an economic value. Better management of inventories would release capital for use elsewhere productively. Hence Inventory control implies the coordination of materials accessibility, controlling, utilization and procuring of material. Throughout the inventory chain from raw material through to retail stocks, inventories are planned and controlled item by item. For each item in every inventory, two questions must be answered again and again: How many of this item should be ordered and when should it be ordered? According to Chalotra (2013) the purposes of inventory control include cost minimization, profit maximization, avoidance of running out of stock and to prevent surplus stock that are unnecessary. One of the most efficient ways of inventory control is the use of Just-in-Time system. This system is explained by Borade and Sweeney (2015) as the inventory control method designed to minimize inventory, and move it to the field for use exactly when needed. The key principle with this system is to eliminate excess inventory. By using this system, a manufacturing company for instance, stays lean by minimizing waste wherever possible.

Warehouse Management

The old concept of the warehouse being dirty and in unorganized form is outdated and costly. Lean concepts including the 5S have found way in warehouse (Dimitrios, 2008). Sorting, setting order, systematic leaning and ensuring discipline makes sure that money is worth spent in all these processes. The principles of any inventory management are not different from other system. Each process from housekeeping to inventory transactions requires a proper, formal standardized process to ensure correct results (Lwiki et al., 2013). It is necessary to allocate warehouse resources efficiently and effectively to enhance the productivity and reduce the operation costs of the warehouse. One vital area determining the efficiency of warehouse is the determination of the proper storage locations for potentially thousands of products in a warehouse (Seungjae, Ennis & Spurlin, 2015). Various factors affecting the storage assignment like order picking method, size and layout of the storage system, material handling

system, product characteristics, demand trends, turnover rates and space requirements are been extensively studied. It has been suggested that selecting appropriate storage assignment policies (random, dedicated or class-based) and routing methods (i.e. transversal, return or combined) with regards to above factors is a possible solution to improve the efficiency (Muller, 2011).

Process Auditing

Proactive source error identification starts with process auditing. One of the most important principles of inventory management is process auditing which should be done often. Process auditing should take place at every transactional steps from receiving and to shipping inventory including all the inventory transactions that takes place in between the processes (Oballah, Waiganjo & Wachiuri, 2015). In most firms, optimal production management aims to minimize work in process. Work in process requires storage space, represents bound capital not available for investment and carries an inherent risk of earlier expiration of shelf life of the products (Ogbo, Onekanma & Ukpere, 2014). A queue leading to a production step shows that the step is well buffered for shortage in supplies from preceding steps, but may also indicate insufficient capacity to process the output from these preceding steps. Work in progress (WIP) is a stage in between the raw material and finished goods. It is no longer raw material because it has undergone some processing in the production process. It is also not yet finished goods because more processing has to be done to put it into its salable condition. WIP includes the items that are being fabricated or waiting in a queue for further processing or in buffer storage (Seungjae, Ennis & Spurlin, 2015). The aim of optimal production management is to minimize the work in progress because it has costs associated with it (Muller, 2011). Work in progress requires storage space, represents tied-up funds not available for investment and carries an inherent risk of earlier expiration or damage of shelf life of the products. The accounting of work in progress is similar to the accounting of inventory. Like any other stock it is valued at the lower of cost and net realizable value (Seungjae, Ennis & Spurlin, 2015). Cost includes the cost of the raw materials, labor cost and other processing costs. Net realizable value is the price for which an item could be sold less costs involved in selling.

Research Methodology

This study used descriptive research design. The researcher used this research design because it allows the use of both qualitative and quantitative data. The target population of this study was all the staff working in the three levels of management in Kenya Power Limited. These levels of management include top management, department management staff and operational staff. The study was a census study and hence the whole population was included in the study. The study used primary data which was collected by use of self-administered questionnaires; the questionnaire includes structured and unstructured questions. Self-administered questionnaires were preferred in this study because they are very economical in terms of time, energy and finances. The structured questions were used in an effort to conserve time and money as well as to facilitate an easier analysis as they are in immediate usable form; while the unstructured questions were used as they encourage the respondent to give an in-depth and felt response without feeling held back in revealing of any information.

A pilot study was conducted in an effort to ensure the validity and reliability of the research instrument. The questionnaire was randomly administered to 10% of the sample size who were not included in the main study. In this study, the content validity was improved by seeking the opinions of experts in the field of study, particularly the supervisor. Also, the face validity of the research

instrument was improved by carrying out a pilot test and changing any unclear and ambiguous question. The questionnaire's reliability was statistically measured by measuring the internal consistency. In turn, internal consistency was measured by use of Cronbach's Alpha. This study used coefficient values > 0.7 is normally accepted rule of thumb that designates acceptable reliability.

Table 1: Cronbach reliability alpha

| Construct | Cronbach reliability alpha |
|----------------------|----------------------------|
| Material management | 0.877 |
| Inventory control | 0.743 |
| Warehouse management | 0.873 |
| Process auditing | 0.732 |
| Performance | 0.721 |
| Average | 0.789 |

According to the findings, material management had a Cronbach reliability alpha of 0.877, inventory control had a Cronbach reliability alpha of 0.743, warehouse management had a Cronbach reliability alpha of 0.873, process auditing had a Cronbach reliability alpha of 0.732 and performance had a Cronbach reliability alpha of 0.721. This clearly shows that the research instrument was reliable and hence no amendments were needed.

Data analysis was both quantitative as well as qualitative. Quantitative data was edited and coded into Statistical Package for Social Sciences (SPSS version 21) for analysis. Both descriptive and inferential statistics was used to analyze quantitative data. In descriptive statistics, the study used frequency, mean, standard deviation and percentages. The analyzed data was then presented in tables and figures. On the other hand, qualitative data was coded thematically and then analyzed by use of thematic content analysis. The results were then presented in form of a prose.

A multivariate regression analysis was also carried out to determine the relationship between dependent variable and the four independent variables. The regression equation was;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Whereby Y = performance, X_1 = Material management, X_2 = Inventory control, X_3 = Warehouse management, X_4 = Process auditing, ε = Error Term, β_0 = Constant Term and $\beta_1, \beta_2, \beta_3, \beta_4$ = Beta Co-efficient

Research Findings and Discussion

The target population of this study was all 146 staff working in the three levels of management in Kenya Power Limited, which include strategic policy tactical, department management staff, and operational staff. Out of 146 staff, 144 responses were obtained. This gives a response rate of 98.63%. A 100% response rate was not achieved as some of the questionnaires had some inconsistent information and some were half way filled and thus could not be used in the study. According to Kothari (2004) a response rate of 50% or more is adequate for analysis, which shows that 98.63% was an acceptable basis for drawing conclusions.

The Influence of Material Management on Performance

The first objective of this study was to establish the influence of raw material management on the performance of the energy sector in Kenya. The respondents were asked to indicate the extent to which material flow influences the performance of their organization. According to the findings, 81.6% of the respondents indicated that material flow influences the performance of their organization to a very great extent, 13.9% indicated to a moderate extent and 4.2% indicated to a great extent. This implies that material flow influences the performance of Kenya Power Limited to a very great extent. These findings concur with Khader et al. (2014) argument that material flow ensures that the right item is bought and made available to for operations at the right time, at the right place and at the lowest possible cost. This leads to cost reduction and an increase in efficiency in service delivery.

The respondents were also asked to indicate the extent to which material procurement influences the performance of their organization. From the findings, 79.2% of the respondents indicated that material procurement influences the performance of their organization to a very great extent, 12.5% indicated to a great extent, 5.6% indicated to a moderate extent and 2.8% indicated to a low extent. This implies that material procurement influences the performance of Kenya Power Limited to a very great extent. These findings agree with Chan and Prakash (2012) argument that procurement of materials influence the performance of an organization.

The respondents were asked to indicate the extent to which transport control influences the performance of their organization. From the findings, 81.9% of the respondents indicated that transport control influences the performance of their organization to a very great extent, 8.3% indicated to a great extent, the same percent indicated to a moderate extent and 1.4% indicated to a low extent. This shows that transport control influences the performance of Kenya Power Limited to a very great extent. These findings concur with Fernandes, Gouveia and Pinho (2013) argument that transportation of raw material affects organizational performance.

Table 2: Influence of Material Management on Performance

| Statement | Low extent | Moderate extent | Great extent | Very great extent |
|--|------------|-----------------|--------------|-------------------|
| Influence of Material Flow on Performance | 0.0 | 13.9 | 4.2 | 81.9 |
| Influence of Material Procurement on Performance | 2.8 | 5.6 | 12.5 | 79.2 |
| Influence of Transport Control on Performance | 1.4 | 8.3 | 8.3 | 81.9 |

The Influence of Inventory Control on Performance

The second objective of the study was to determine the influence of inventory control on the performance of the energy sector in Kenya. The respondents were asked to indicate the extent to which inventory tracking influences the performance of their organization. According to the findings, 77.8% of the respondents indicated that inventory tracking influences the performance of their organization to a very great extent, 13.9% indicated to a moderate extent, 5.6% indicated to a great extent, 1.4% indicated to a low extent and the same percent indicated to no extent at all. This shows that inventory tracking influences the performance of Kenya Power Limited to a very great extent. These findings agree with Borade and Sweeney (2015) argument that inventory tracking influences organizational performance.

The respondents were asked to indicate the extent to which reorder level policy influences the performance of their organization. From the findings, 70.8% of the respondents indicated that reorder level policy influences the performance of their organization to a very great extent, 12.5% indicated to

a great extent, the same percent indicated to a moderate extent, 2.8% indicated to a moderate extent and 1.4% indicated to no extent at all. This shows that reorder level policy influences the performance of Kenya Power Limited to a very great extent. These findings agree Gulphanich, Nilas and Roengruen (2012) order level policy influences organizational performance. The study sought to find out the extent to which demand forecasting influences the performance of their organization. From the findings, 65.3% indicated that demand forecasting influences the performance of their organization to a very great extent, 18.1% indicated to a moderate extent, 13.9% indicated to a great extent and 2.8% indicated to no extent at all. This shows that demand forecasting influences the performance of Kenya Power Limited to a very great extent.

Table 3: Influence of Inventory tracking on performance

| Statement | No extent at all | Low extent | Moderate extent | Great extent | Very great extent |
|--|------------------|------------|-----------------|--------------|-------------------|
| Influence of Inventory control on performance | 1.4 | 1.4 | 13.9 | 5.6 | 77.8 |
| Influence of Reorder level policy on performance | 1.4 | 2.8 | 12.5 | 12.5 | 70.8 |
| Influence of demand forecasting on performance | 2.8 | | 18.1 | 13.9 | 65.3 |

The Influence of Warehouse management on Performance

The third objective of the study was to find out the influence of warehouse management on the performance of the energy sector in Kenya. The respondents were asked to indicate whether their organization had adopted a warehouse management system. As indicated in figure 4.7, 94.4% of the respondents indicated that their organization had adopted a warehouse management system while 5.6% disagreed. This implies that their Organization had adopted a warehouse management system. According to Rachmania and Basri (2013) warehouse management system supports the day-to-day operations in a warehouse. Warehouse management system enables centralized management of tasks such as tracking inventory levels and stock locations.

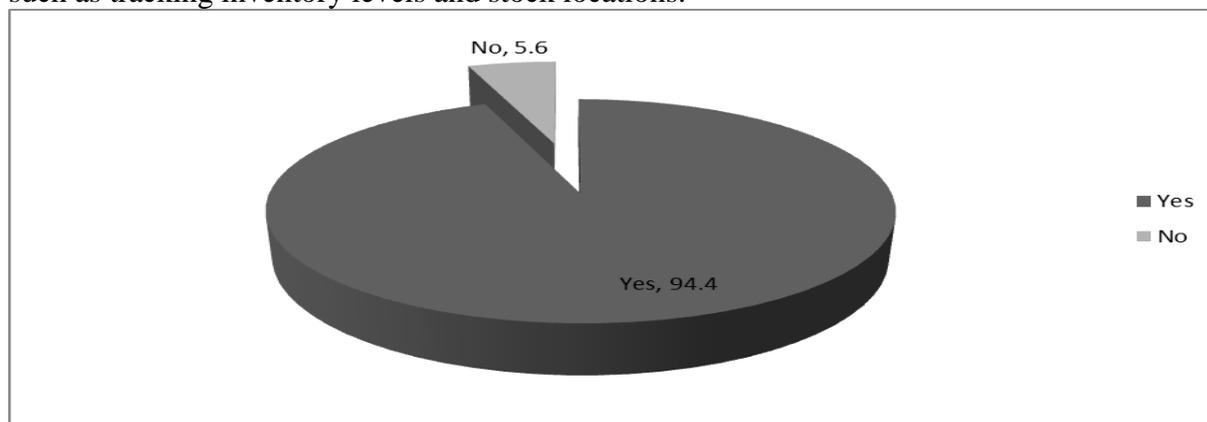


Figure 2: Adoption of Warehouse Management System

Warehouse management and Performance

The respondents were asked to indicate the extent to which special storage needs influence the performance of their organization. From the findings, 69.4% of the respondents indicated that special storage needs influence the performance of their organization to a great extent, 15.3% indicated to a great extent, 9.7% indicated to a moderate extent, 4.2% indicated to a low extent and 1.4% indicated to no extent at all. This implies that special storage needs influence the performance of their organization to a great extent.

The respondents were asked to indicate the extent to which storage assignment policies influence the performance of their organization. According to the findings, 69.4% of the respondents indicated that storage assignment policies influence the performance of their organization to a great extent, 22.2% indicated to a great extent, 6.9% indicated to a moderate extent and 1.4 indicated to a low extent. This shows that storage assignment policies influence the performance of Kenya Power Limited to a great extent. These findings agree with Muller (2011), argument that selecting appropriate storage assignment policies (random, dedicated or class-based) and routing methods (i.e. transversal, return or combined) with regards to above factors is a possible solution to improve the efficiency.

Table 4: Warehouse management and Performance

| Statement | No extent at all | Low extent | Moderate extent | Great extent | Very great extent |
|---|------------------|------------|-----------------|--------------|-------------------|
| Influence of Special storage needs on the performance | 1.4 | 4.2 | 9.7 | 15.3 | 69.4 |
| Influence of storage assignment policies on performance | 0.0 | 1.4 | 6.9 | 22.2 | 69.4 |

The Influence of Process auditing on Performance

The fourth objective of the study was to determine the influence of process auditing on the performance of the energy sector in Kenya. The respondents were also asked to indicate how often their organization conducts a process auditing. According to the findings, 82% of the respondents indicated that their organization conducts a process auditing twice a year, 8.3% indicated once a year, the same percent indicated four times a year and 1.4% indicated thrice a year. This implies that Kenya Power Limited conducts a process auditing twice a year. According to Oballah, Waiganjo and Wachiuri, (2015), process auditing should take place at every transactional steps from receiving and to shipping inventory including all the inventory transactions that takes place in between the processes.

Table 5: Frequency of Conducting Process Auditing

| | Frequency | Percent |
|-------------------|------------|--------------|
| Four times a year | 12 | 8.3 |
| Thrice a year | 2 | 1.4 |
| Once a year | 12 | 8.3 |
| Twice a year | 118 | 82.0 |
| Total | 144 | 100.0 |

Process auditing on Performance

The respondents were asked to indicate the extent to which service delivery cost influence the performance of their organization. According to the findings, 73.6% of the respondents indicated that service delivery cost influences the performance of their organization to a very great extent, 12.5% indicated to a moderate extent, 11.1% indicated to a great extent and 2.8% indicated to a low extent. This implies service delivery cost influences the performance of their organization to a very great extent. These findings agree with Seungjae, Ennis and Spurlin (2015) argument that service delivery cost influences organizational performance.

The respondents were also asked to indicate the extent to which service delivery time influences the performance of their organization. According to the findings, 81.9% of the respondents indicated that service delivery time influences the performance of their organization to a very great extent, 12.5% indicated to a moderate extent, 4.2% indicated to a great extent and 1.4% indicated to a low extent. This implies that service delivery time influences the performance of their organization to a very great extent. These findings concur with Muller (2011) argument that service delivery time affects organizational performance.

The respondents were asked to indicate whether project diminishing time influences the performance of their organization. From the findings, 75% of the respondents indicated that project diminishing time influences the performance of their organization to a very great extent, 13.9% indicated to a moderate extent, 9.7% indicated to a great extent and 1.4% indicated to a low extent. This implies that project diminishing time influences the performance of Kenya Power Limited to great extent. These findings agree with Seungjae, Ennis and Spurlin (2015) argue that project diminishing time affects organizational performance.

Table 6: Process auditing on Performance

| Statement | No extent at all | Low extent | Moderate extent | Great extent | Very great extent |
|--|------------------|------------|-----------------|--------------|-------------------|
| Influence Service delivery cost on performance | 0.0 | 2.8 | 12.5 | 11.1 | 73.6 |
| Influence Service Delivery Time on Performance | 0.0 | 1.4 | 12.5 | 4.2 | 81.9 |
| Influence of Project diminishing time on Performance | | 1.4 | 13.9 | 9.7 | 75 |

Performance of Kenya Power Limited

Kenya Power Limited Profitability

The respondents were asked to indicate the annual profits of their organization for the last 6 years (2010-2015). From the findings, the profits of Kenya Power Limited have been fluctuating over the years. In the year 2010 the profits were Ksh 5,632 million, which increased to Ksh. 6,254 million in 2011 and Ksh. 8,506 million in 2012. The profits of Kenya Power Limited decreased to Ksh. 1,098 million in 2013. This figure later increased to Ksh. 6,570 million in 2014 and Ksh. 7,570 million in 2015.

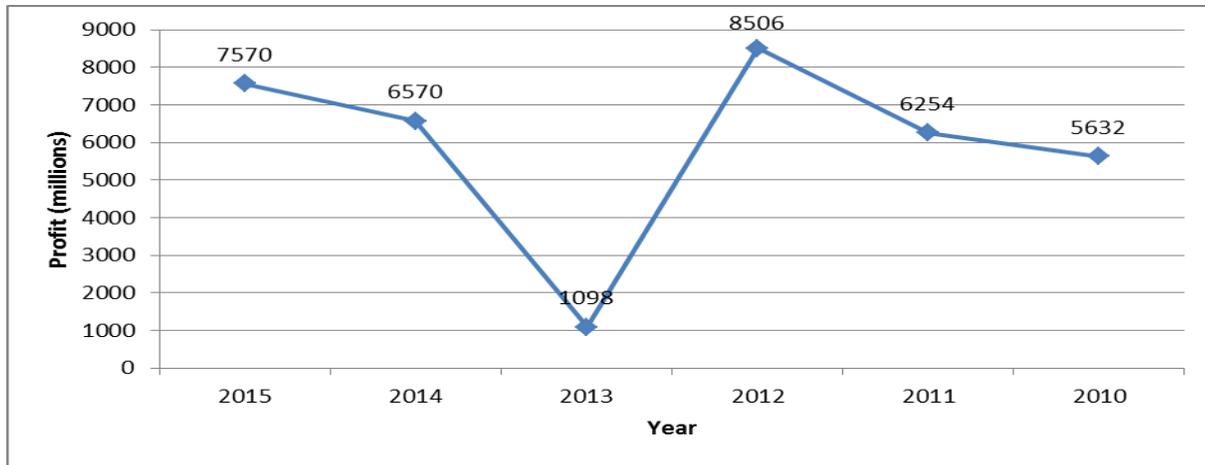


Figure 3: Kenya Power Limited Profitability

Cost of Service Delivery

The respondents were asked to indicate the annual cost of delivery in their organization for the period ranging from 2010 and 2015. As indicated in figure 4.15, the cost of service delivery in Kenya Power Limited was Ksh 14,911 million in the year 2010. This figure increased to Ksh. 17,694 million in the year 2011, Ksh. 19,679 in the year 2012 and Ksh. 22,682 million in the year 2013. However, cost of service delivery reduced to Ksh. 20,984 million in 2014 before increasing to 21,654 in the year 2015.

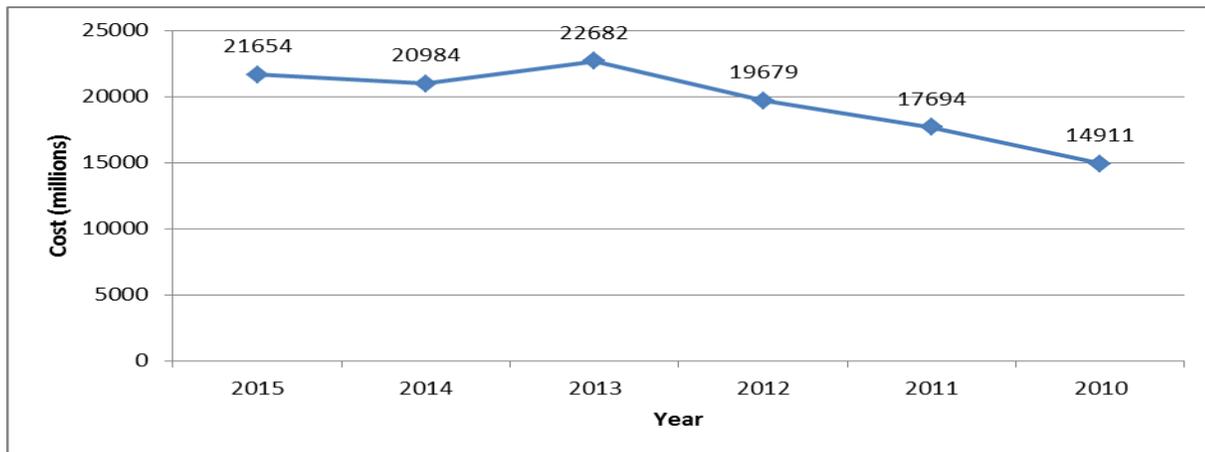


Figure 4: Cost of Service Delivery

Customer Satisfaction Index in Kenya Power Limited

The respondents were also asked to indicate the customer satisfaction index in their organization for the last 6 years. According to the findings, customer satisfaction index in Kenya Power Limited was 69% in the year 2010. This increased to 70% in 2011 and decreased to 66% in 2012. Customer satisfaction index in Kenya Power Limited was 69% in 2013, increased to 72% in the year 2014 and 85% in the year 2015. This shows that customer satisfaction index in Kenya Power Limited was fluctuating over the years with 2015 having the highest figure.

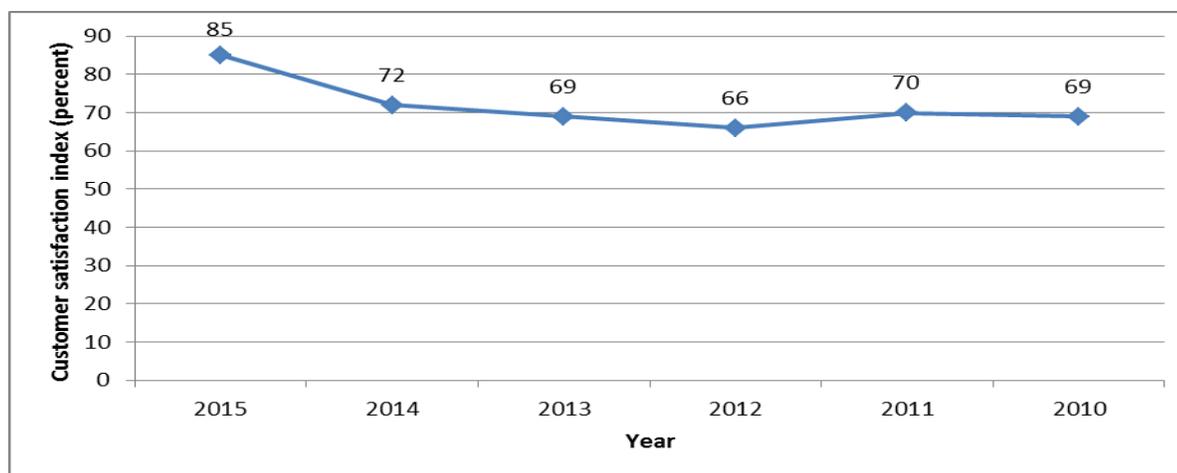


Figure 5: Customer Satisfaction Index in Kenya Power Limited

Regression Analysis

A multivariate regression analysis was also carried out to determine the relationship between dependent variable and the four independent variables. The regression equation was;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Whereby; Y = performance; X₁ = Material management, X₂ = Inventory control, X₃ = Warehouse management, X₄ = Process auditing, ε = Error Term, β_0 = Constant Term and $\beta_1, \beta_2, \beta_3, \beta_4$ = Beta Co-efficient

The R-Squared is the proportion of variance in the dependent variable which can be explained by the independent variables. From the findings, the R-squared in this study was 0.63044, which shows that the four independent variables (raw material management, inventory control, warehouse management and process auditing) can explain 63.044% of the variation in the dependent variable. This clearly shows that other factors not considered in this study explain 36.956% of the variation in the dependent variable, performance of Kenya Power Limited.

Table 10: Model Summary

| Model | R | R Square | Adjusted Square | R Std. Error of the Estimate |
|-------|-------|----------|-----------------|------------------------------|
| 1 | 0.794 | 0.63044 | 0.6017 | 0.07822 |

From Table 11, the analysis of variance in this study was used to determine whether the model is a good fit for the data. The results indicate that the model was significant since the p-value (0.000) was less than 0.05 thus the model is statistically significance in establishing the influence of raw material management, inventory control, warehouse management and process auditing on the performance of Kenya Power Limited. Further, the F-calculated (2780.950) was found to be more than the F-critical (2.46) which shows that the models was fit in establishing the influence of the four independent variables on the dependent variable.

Table 11: Analysis of Variance

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|----------|-------------------|
| 1 | Regression | 68.064 | 4 | 17.016 | 2780.950 | .000 ^b |
| | Residual | .851 | 139 | .006 | | |
| | Total | 68.915 | 143 | | | |

The regression model was;

$$Y = 0.013 + 0.306X_1 + 0.701X_2 + 0.113X_3 + 0.108X_4$$

From the table above, the findings show that there is a positive significant relationship between material management and performance of Kenya Power Limited with a regression coefficient of 0.306. This shows that a unit increase in material management would lead to a 0.306 improvement in the performance of Kenya Power Limited. The p-value (0.000) was less than the significance level (0.05), hence the relationship was significant. The results also show that there is a positive significant relationship between inventory control and performance of Kenya Power Limited with a regression coefficient of 0.701. This shows that a unit increase in inventory control would lead to a 0.701 improvement in the performance of Kenya Power Limited. The relationship was significant as the p-value (0.000) was less than the significance level (0.05).

From the findings, the study found that there is a positive relationship between warehouse management and the performance of Kenya Power Limited with a regression coefficient of 0.113. This indicates that a unit increase in warehouse management would lead to a 0.113 improvement in the performance of Kenya Power Limited. . The relationship was found to be significant as the p-value (0.036) was less than the significance level (0.05). Lastly, the study results show that there is a positive significant relationship between process auditing and the performance of Kenya Power Limited as shown by a regression coefficient of 0.108. This indicates that a unit improvement of process auditing would lead to a 0.108 improvement in the performance of Kenya Power Limited. This relationship was significant as the p-value (0.045) was less than that of the significance level (0.05).

Table 12: Regression Coefficients

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|----------------------|-----------------------------|------------|---------------------------|--------|-------|
| | B | Std. Error | Beta | | |
| (Constant) | 0.013 | 0.053 | | 0.239 | 0.812 |
| Material management | 0.306 | 0.022 | 0.267 | 13.909 | 0.000 |
| Inventory control | 0.701 | 0.016 | 0.775 | 43.813 | 0.000 |
| Warehouse management | 0.133 | 0.016 | 0.034 | 8.313 | 0.036 |
| Process auditing | 0.108 | 0.048 | 0.038 | 2.250 | 0.045 |

Conclusion

The study concludes that there is a positive significant relationship between material management and performance of Kenya Power Limited. The study found that material flow, material procurement and transportation control influence performance of Kenya Power Limited. The study also concludes that there is a positive significant relationship between inventory control and performance of Kenya Power Limited. The study established that reorder level policy, demand forecasting and inventory tracking

influence performance of Kenya Power Limited. The study further concludes that there is a positive relationship between warehouse management and the performance of Kenya Power Limited. The study revealed that special storage needs, storage assignment policies and storage size influence the performance of Kenya Power Limited. Lastly, the study concludes that there is a positive significant relationship between process auditing and the performance of Kenya Power Limited. The study found that service delivery cost, service delivery time and project diminishing time the performance of Kenya Power Limited. Therefore, it is proved that inventory management influences the performance of the energy sector in Kenya.

Recommendations

The study found that material flow and management influence organizational performance. The study therefore recommends that the inventory management of Kenya Power Limited should enhance material flow in the organization as a way or enhancing efficiency in service delivery. The study also found inventory tracking to influence organizational performance in Kenya. The study therefore recommends that staff in supply chain management department should improve inventory tracking by use of information technology in improving inventory management.

The study also found out that demand forecasting and reorder level policy influence organizational performance. The study therefore recommends that Kenya Power Limited should enhance its demand forecasting and review its reorder level policy. The study established that special storage needs influence the performance Kenya Power Limited. Kenya Power limited has special storage needs which include special equipment and chemicals. This study therefore recommends that Kenya Power Limited should improve on its warehouses to cater for special storage requirements. The study found that Kenya Power Limited conducts a process auditing twice a year. The study recommends that the company should increase its frequency of process auditing to quarterly a year.

Areas for Further Research

This study focused on Kenya Power limited and hence its findings cannot be generalized to the rest of energy sector in Kenya. This study therefore suggests similar studies on the influence of inventory management on the performance of other organization in the energy sector in Kenya, to include other players in the sector like Kenya Electricity Generating Company (KenGen), Ministry of Energy, Rural Electricity Authority, Kenya Electricity Transmission Company (KETRACO), Kenya Nuclear Electricity Board (KNEB) and Energy Regulatory Commission (ERC). Also, further studies should be conducted on the influence of inventory management on the performance of other public institutions in Kenya. The study also suggests further studies on the challenges facing inventory management in the energy sector in Kenya. The study also found that inventory management influences 63.044% of the performance in the Kenyan Energy Sector. This study therefore recommends further studies to investigate other factors that influence performance in the Kenyan energy sector.

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